

CLAIMS

What is claimed is:

1. A method for forming a relief pattern from a photosensitive
 5 element containing a composition layer having an exterior surface and
 capable of being partially liquefied, comprising:
 heating the exterior surface of the composition layer at a
 heating station to a temperature T_r sufficient to cause a portion of the layer
 to liquefy and cause one or more components in the layer to form a vapor;
 10 and
 collecting the vapor at the heating station.
2. The method of Claim 1 further comprising:
 supplying an absorbent material to the exterior surface of the
 composition layer with a first member;
 15 supporting the photosensitive element with a second member;
 and
 contacting the photosensitive element with the absorbent
 material to allow at least a portion of the liquefied material of the
 composition layer to be absorbed by the absorbent material.
- 20 3. The method of Claim 2 wherein the heating station is at or
 adjacent to the contacting with the absorbent material.
4. The method of Claim 2 wherein the heating step is selected from
 the group consisting of
 a first heating which applies heat to the exterior surface of the
 25 composition layer adjacent where the absorbent material contacts the
 layer, the first heating adapted to heat the exterior surface of the layer to
 temperature T_1 ;
 a second heating to heat the first member to a temperature capable
 of heating the exterior surface of the composition layer to a temperature
 30 T_2 while the absorbent material is contacting the exterior surface of the
 layer;
 a third heating to heat the second member to a temperature
 capable of heating the exterior surface of the composition layer to a
 temperature T_3 ;
 35 a combination of the first heating and the second heating;
 a combination of the first heating and the third heating;
 a combination of the second heating and the third heating; and
 a combination of the first heating, the second heating and the third
 heating.

5. The method of Claim 2 wherein the contacting step is performed by pressing the photosensitive element and the absorbent material into contact at a pressure sufficient for at least a portion of the liquefied material of the composition layer to be absorbed by the absorbent material.
6. The method of Claim 2 further comprising separating the photosensitive element from the absorbent material.
7. The method of Claim 1 further comprising confining the vapor.
8. The method of Claim 7 wherein all or a portion of the vapor during or after the confining step cools or is cooled to form a condensate.
9. The method of Claim 8 wherein the confining step further comprises confining the condensate.
10. The method of Claim 8 wherein the vapor cools to form a condensate.
11. The method of Claim 8 further comprising collecting the condensate.
12. The method of Claim 7 further comprising managing removal of the vapor during or after the confining step.
13. The method of Claim 12 wherein all or a portion of the vapor cools or is cooled to form a condensate and the managing step comprises removing of the condensate.
14. The method of Claim 13 wherein the managing step further comprises separating the vapor from the condensate and collecting the condensate.
15. The method of Claim 13 wherein the managing step further comprises delivering the condensate to an absorbent material that also absorbs the liquefied material of the composition layer.
16. The method of Claim 13 wherein the managing step comprises delivering the condensate to a condensate absorbent material.
17. The method of Claim 13 wherein the managing step further comprises exposing the condensate to actinic radiation.
18. The method of Claim 12 wherein the managing step comprises exhausting the confined vapor to an external exhaust collection system.
19. The method of Claim 18 further comprising maintaining a non-recirculating flow of the confined vapor in the exhaust collection system.
20. The method of Claim 18 wherein the external exhaust collection system comprises one or more parts composed of a condensate absorbent material.

21. The method of Claim 12 further comprising transporting the confined vapor through a condensate absorbent material.

22. The method of Claim 12 wherein the managing step comprises maintaining the vapor at a temperature sufficient to keep the vapor in its vaporized state for removal.

23. The method of Claim 12 wherein the managing step comprises cooling the vapor to a temperature sufficient to condense one or more of the components.

24. The method of Claim 1 further comprising shrouding the vapor at the heating station.

25. The method of Claim 1 wherein the photosensitive element is selected from the group consisting of a sheet, a cylinder and a sheet on a sleeve.

26. The method of Claim 1 wherein the heating step generates heated air, the method further comprising removing the heated air.

27. The method of Claim 1 wherein the heating step generates heat, the method further comprising controlling the heat.

28. The method of Claim 1 further comprising supplying air at the heating station.

29. The method of Claim 1 further comprising containing the vapor for collection by the collecting step at the heating station.

30. The method of Claim 1 further comprising exhausting the vapor from the collecting step.

31. An apparatus for forming a relief pattern from a photosensitive element containing a composition layer having an exterior surface and capable of being partially liquefied, comprising:

means for heating the exterior surface of the composition layer to a temperature T_r sufficient to cause a portion of the layer to liquefy and cause one or more components in the layer to form a vapor; and

means for collecting the vapor at or adjacent the heating means.

32. The apparatus of Claim 31 further comprising:

means for supplying an absorbent material to the exterior surface of the composition layer;

means for supporting the photosensitive element, wherein at least one of the means for supplying and the means for supporting are movable relative to the other; and

means for contacting the photosensitive element with the absorbent material to allow at least a portion of the liquefied material of the composition layer to be absorbed by the absorbent material.

5 33. The apparatus of Claim 32 further comprising means for separating the photosensitive element from the absorbent material.

34. The apparatus of Claim 32 wherein the means for supplying comprises a roller mounted for rotation in a first frame portion.

10 35. The apparatus of Claim 32 wherein the means for supporting comprises a drum mounted for rotation in a second frame portion, the drum having an outer circumferential surface adapted to support the photosensitive element.

36. The apparatus of Claim 32 wherein the means for heating is selected from the group consisting of

15 a first heating means for applying heat to the exterior surface of the composition layer adjacent where the absorbent material contacts the layer, the first heating means adapted to heat the exterior surface of the layer to temperature T1;

20 a second heating means for heating the supplying means to a temperature capable of heating the exterior surface of the composition layer to a temperature T2 while the absorbent material is contacting the exterior surface of the layer;

a third heating means for heating the supporting means to a temperature capable of heating the exterior surface of the composition layer to a temperature T3;

25 a combination of the first heating means and the second heating means;

a combination of the first heating means and the third heating means;

30 a combination of the second heating means and third heating means; and

a combination of the first heating means, the second heating means, and the third heating means.

37. The apparatus of Claim 31 further comprising means for confining the vapor.

35 38. The apparatus of Claim 31 further comprising means for managing removal of the vapor.

39. The apparatus of Claim 38 wherein the means for managing comprises means for exhausting the vapor.

40. The apparatus of Claim 39 wherein the means for exhausting the vapor is an external exhaust collection system.

41. The apparatus of Claim 39 wherein the means for managing further comprises means for maintaining a non-recirculating flow of the vapor.

42. The apparatus of Claim 39 wherein the means for managing further comprises means for maintaining the vapor at a temperature sufficient to keep the vapor in its vaporized state for removal.

43. The apparatus of Claim 38 wherein the means for managing further comprises means for cooling the vapor to a temperature sufficient to condense one or more of the components.

44. The apparatus of Claim 31 wherein all or a portion of the vapor cools or is cooled to form a condensate.

45. The apparatus of Claim 44 further comprising means for confining the vapor and the condensate.

46. The apparatus of Claim 44 further comprising means for managing the vapor and the condensate.

47. The apparatus of Claim 45 wherein the managing means further comprises means for separating the vapor from the condensate.

48. The apparatus of Claim 44 further comprising means for collecting the condensate.

49. The apparatus of Claim 44 comprising means for delivering the condensate to an absorbent material that also absorbs the liquefied material of the composition layer.

50. The apparatus of Claim 44 comprising means for delivering the condensate to a condensate absorbent material.

51. The apparatus of Claim 44 further comprising means for exposing the condensate to actinic radiation.

52. The apparatus of Claim 46 further comprising means for exhausting the vapor.

53. The apparatus of Claim 52 further comprising means for maintaining a nonrecirculating flow of the vapor.

54. The apparatus of Claim 52 wherein the means for exhausting the vapor comprises one or more parts composed of a condensate absorbent material.

55. The apparatus of Claim 46 wherein the means for managing further comprises means for transporting the vapor through a condensate absorbent material.

56. The apparatus of Claim 31 wherein the heating means is a heating station.

57. The apparatus of Claim 31 wherein the means for collecting the vapor is a manifold.

5 58. The apparatus of Claim 31 further comprising means for exhausting the vapor collected by the collecting means.

59. The apparatus of Claim 31 further comprising means for shrouding the vapor at or adjacent the heating means.

10 60. The apparatus of Claim 31 wherein the means for heating generates heated air, the apparatus further comprising means for removing the heated air.

61. The apparatus of Claim 31 wherein the means for heating generates heat, the apparatus further comprising controlling the heat.

15 62. The apparatus of Claim 31 further comprising means for supplying air at the heating station.

63. The apparatus of Claim 31 further comprising means for directing the vapor at the heating station to the means for collecting.